

7. PRODUCTION STAGE

7.1. Overview. The Production stage has a different character from the preceding phases and stages of the system life cycle. Those phases and stages were concerned with evolving the system to a state where it can be used. In this stage, the production system is fully usable. Some of the most significant activities of this stage include:

- o Using the system to solve the information problem that spurred the creation of the system.
- o Performing system operation activities needed to support the users.
- o Maintaining the system to ensure that any previously undetected errors are fixed and to take advantage of hardware upgrades or new releases of system software and application software packages used to operate the system (e.g., upgrades and releases installed by the National Computer Center).
- o Determining what modifications to the system are needed to continue to solve the information management problem, including requested modifications deferred from prior stages, and developing and implementing these modifications.
- o Determining when a system evaluation is needed to address the extent to which the system addresses the information management problem, performs efficiently, and/or is managed effectively.

The Production stage starts with the results of the work conducted in all prior stages, and activities of this stage frequently respond to the results of activities of prior stages. Deficiencies and problems not resolved adequately in prior stages are usually identified by users during Production.

Because of the nature of this stage, there is no milestone marking its end. The Evaluation stage (see Chapter 8) may occur one or more times throughout the Production stage. Each time the system is evaluated, one of two decisions is made: either the system is continued in operation (in which case the Production stage continues), or the system is to be archived, and its functions and data transferred to other systems (in which case this stage ends and the system moves to the Archive stage). Several items are of particular note for this stage:

- o Formal review of requested modifications to the system before they are made is essential to the integrity of the system. The procedures for reviewing requested modifications are contained in the Configuration Management Plan, a section of the Project Management Plan.

- o Some requested modifications may be of such significance that they are classified as major enhancements and addressed through a separate iteration of the life cycle. Modifications which will have the effect of altering the types of data to be processed by the system generally should be handled in this manner.
- o All modifications should be completely documented to provide system users, and those responsible for operating and maintaining the system, the information needed to successfully use the system and to perform other activities needed for effective system operations.
- o Some systems are operated completely by users, particularly systems that operate on microcomputers. It is essential that users are fully aware of and carry out their responsibilities for all facets of operations, especially performing system backups.
- o Providing user support is usually an ongoing activity. New users will require training to effectively use the system, and other users may require assistance as well.
- o The Project Management Plan is continually updated to reflect the approach for managing the system through the entire Production stage.

7.2 Detailed Description. A detailed description of the Production stage is presented in the following exhibits:

Exhibit 7-1	Production Stage Summary
Exhibit 7-2	Production Stage Objectives
Exhibit 7-3	Production Stage Decisions
Exhibit 7-4	Production Stage Activities
Exhibit 7-5	Production Stage Roles and Responsibilities
Exhibit 7-6	Product: Performance Report
Exhibit 7-7	Product: System Test Document
Exhibit 7-8	Product: Acceptance Test Document

Several products of this stage are identified in Exhibit 7-1, but are not described in detail in this section. These products are updated throughout the Production stage as needed; however, their basic structure does not change.

The following products may also be updated during the Production stage:

<u>Product</u>	<u>Exhibit</u>
Initiation Baseline	
Initiation Decision Paper	1-6
System Concept	2-6

Definition Baseline	
Configuration Accounting Records	3-6
Detailed Functional Requirements	3-7
Detailed Data Requirements	3-8
Requirements Data Dictionary	3-10
Design Baseline	
System Design	4-6
Physical Data Base Design	4-8
Design Data Dictionary	4-9
Development Baseline	
Development System	5-6
Development Data Base(s)	5-7
Maintenance Manual	5-8
User Manual	5-9
Operation Manual	5-10
Security Manual	5-11
User Support Materials	5-12
Operational Baseline	
Production System	6-6
Production Data Base(s)	6-7
Production Data Dictionary	6-8
Project Management Plan	6-12
Data Management Plan	6-13

Outlines of all products are presented in Appendix B.

A number of activities of the Production stage relate to specific topics that are addressed throughout the life cycle. A life cycle wide view of these topics, including project management planning, quality assurance, configuration management and data administration is presented in Chapter 10 of Part 2 of this Guidance. This chapter also addresses other topics of interest throughout the life cycle, including reviews and approvals, selection of tools and methodologies, and development and update of the benefit-cost analysis.

EXHIBIT 7-1: PRODUCTION STAGE SUMMARY

OBJECTIVES

- o USE THE SYSTEM TO SOLVE THE INFORMATION MANAGEMENT PROBLEM
- o IDENTIFY POTENTIAL MODIFICATIONS NEEDED TO ENSURE THAT THE SYSTEM AND DATA CONTINUE TO SOLVE THE INFORMATION MANAGEMENT PROBLEM
- o DEVELOP AND IMPLEMENT MAINTENANCE CHANGES AND MINOR ENHANCEMENTS

DECISIONS

PROJECT APPROACH DECISIONS:
 WHAT EVALUATIONS OF THE SYSTEM/DATA SHOULD BE CONDUCTED?
 WHAT NEW OR ADDITIONAL USER SUPPORT ACTIVITIES ARE NEEDED?

PROJECT EXECUTION DECISIONS:
 WHAT CHANGES/ENHANCEMENTS TO THE SYSTEM/DATA BASE(S) ARE NEEDED?
 SHOULD A PARTICULAR ENHANCEMENT BE IMPLEMENTED WITHIN THIS STAGE, OR GIVEN ITS OWN LIFE CYCLE?

PROJECT CONTINUATION DECISIONS:
 NONE -- CONTINUATION DECISIONS ARE MADE AS THE RESULT OF SYSTEM EVALUATIONS. SEE THE EVALUATION STAGE.

ACTIVITIES

PROJECT APPROACH ACTIVITIES:
 RESPOND TO DEFERRED CHANGES/ ENHANCEMENTS
 RESPOND TO NEWLY PROPOSED CHANGES/ ENHANCEMENTS
 CONTINUE CONFIGURATION ACCOUNTING AND CHANGE CONTROL
 MONITOR SYSTEM/DATA BASE PERFORMANCE
 UPDATE PROJECT MANAGEMENT PLAN
 UPDATE DATA MANAGEMENT PLAN

PROJECT EXECUTION ACTIVITIES:
 USE SYSTEM/DATA BASE(S) FOR NORMAL PRODUCTION
 OPERATE SYSTEM/DATA BASE(S)
 PROVIDE USER SUPPORT
 MAINTAIN SYSTEM/DATA BASE(S)
 DEVELOP AND IMPLEMENT MINOR ENHANCEMENTS AS NEEDED

PRODUCTS

NEW:
 PERFORMANCE REPORT

UPDATED:
 INITIATION BASELINE
 DEFINITION BASELINE
 DESIGN BASELINE
 DEVELOPMENT BASELINE
 OPERATIONAL BASELINE
 PROJECT MANAGEMENT PLAN
 DATA MANAGEMENT PLAN
 SYSTEM TEST DOCUMENT
 ACCEPTANCE TEST DOCUMENT

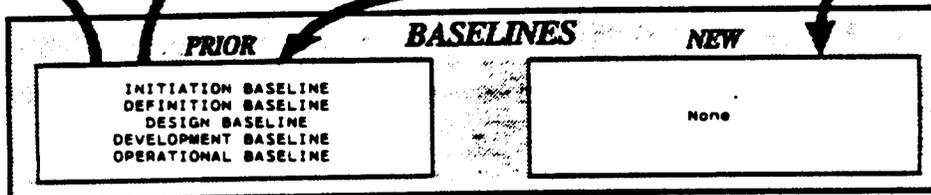




EXHIBIT 7-2: PRODUCTION STAGE OBJECTIVES

OBJECTIVE NAME	OBJECTIVE DESCRIPTION
Use the system to solve the information management problem	Uses the capabilities of the system and data base(s) to solve the information management problem underlying the development and continued operation of the system.
Identify potential modifications needed to ensure that the system and data continue to solve the information management problem	Determines whether modifications to the system and data base(s) are needed to resolve errors or performance problems, or to provide new capabilities. New capabilities may take the form of routine maintenance, or may constitute enhancements to the system or data base(s) which respond to user requests for new/improved capabilities.
Develop and implement maintenance changes and minor enhancements	Develops and implements corrections to system/data base errors, and other maintenance changes needed to continue system operation. Develops and implements approved minor enhancements to respond to the information management problem. All maintenance changes and enhancements are controlled through baselines.



EXHIBIT 7-3: PRODUCTION STAGE DECISIONS

DECISION NAME

DECISION DESCRIPTION

Project Approach Decisions:

What evaluations of the system/data should be conducted?

Determines whether an evaluation of the system is appropriate in view of potential new requirements, system performance, experience in maintaining the system, availability of new technology, cost experience, or other factors. Schedules mandatory evaluations (e.g., the post-implementation review).

What new or additional user support activities are needed?

Determines whether the current level of user support is appropriate in view of user experience with the system, or should be adjusted in terms of training, user aids, technical support, or other actions.

Project Execution Decisions:

What changes/enhancements to the system/data base(s) are needed?

Determines changes and enhancements that should be made to the system/data base(s) to enable the system to continue operating and responding to the information management problem.

Should a particular enhancement be implemented within this stage, or given its own life cycle?

Determines whether a requested enhancement to the system should be accomplished as a minor enhancement within the Production stage, or is of such significance that it should be accorded its own life cycle, including an analysis of alternatives for obtaining the functional capability identified by the user in requesting the enhancement. Potential factors to be considered which tend to require the start of a new life cycle include the processing of additional data, major impact on the design of the system or data base(s) (including a change in the hardware/software environment), high cost to accomplish the enhancement, or potential significant impact on multiple OSWER offices and/or regional offices or state agencies. (Additional guidance for this determination is provided in the Part 3 Practice Paper regarding life cycle management thresholds, reviews, and approvals.)



EXHIBIT 7-4: PRODUCTION STAGE ACTIVITIES

ACTIVITY NAME	ACTIVITY DESCRIPTION	PRODUCT CONTAINING RESULTS
Respond to deferred changes/enhancements	<p><u>Project Approach activities:</u></p> <p>Examine proposed changes and enhancements that were deferred from earlier stages to assure that they contribute to solving the information management problem and are compatible with the developed system. This examination is conducted in accordance with the Configuration Management Plan contained in the Project Management Plan.</p>	Configuration Accounting Records
Respond to newly proposed changes/enhancements	<p>Examine changes and enhancements proposed during the Production stage to assure that contribute to solving the information management problem and are compatible with the developed system. This examination is conducted in accordance with the Configuration Management Plan in the Project Management Plan.</p>	Configuration Accounting Records
Continue configuration accounting and change control	<p>Maintain records of suggested modifications to the system, and their dispositions. Identify potential modifications determined to be so significant that they are to be addressed through a new life cycle.</p>	Configuration Accounting Records
Monitor system/data base performance	<p>Continually monitor system and data base usage and performance to identify potential problems requiring modifications to the system, data base(s), or user support activities. For large systems using shared facilities (e.g., NCC mainframe computer), examine reports provided by facility management group.</p>	Performance Report



EXHIBIT 7-4: PRODUCTION STAGE ACTIVITIES (Continued)

ACTIVITY NAME	ACTIVITY DESCRIPTION	PRODUCT CONTAINING RESULTS
Update Project Management Plan	<p><u>Project Approach Activities (Continued):</u></p> <p>Refine the workplan for the Operation phase. Be sure to note any changes to the project organization and staffing. Update and refine the benefit-cost analysis as needed to reflect experience in operating the system, and the impact of modifications to the system.</p>	Project Management Plan
Update Data Management Plan	<p>Refine the Data Management Plan as needed to address issues raised during routine operation of the system.</p>	Data Management Plan
Use system/data base(s) for normal production	<p><u>Project Execution Activities:</u></p> <p>Use the system to support program activities in accordance with procedures provided in the User Manual.</p>	Production Data Base(s)
Operate system/data base(s)	<p>Run the system and data base(s) in accordance with procedures provided in the Operation Manual. Some or all elements of system/data base operation, including system backups, may be performed by users.</p>	Production Data Base(s)
Provide user support	<p>Provide training, user aids, technical support, and other types of assistance needed by existing and new users.</p>	--



EXHIBIT 7-4: PRODUCTION STAGE ACTIVITIES (Continued)

ACTIVITY NAME	ACTIVITY DESCRIPTION	PRODUCT CONTAINING RESULTS
Maintain system/data base(s)	<p><u>Project Execution Activities (Continued):</u></p> <p>Develop, implement, and fully test modifications to the system and data base(s) needed to correct identified errors, to accommodate routine updates to the operating environment, and/or to optimize performance. Maintain related documentation. Communicate modifications to affected organization/individuals.</p>	Production System Production Data Base(s) Production Data Dictionary Reference Manuals System Test Document Acceptance Test Document
Develop and implement minor enhancements as needed	<p>In response to user requests, develop, implement, and fully test approved minor enhancements to the system, and maintain related documentation. Minor enhancements are considered to be those enhancements that provide additional functionality and/or improve performance, but that do not alter the data structure used in the system. Major enhancements have their own life cycles.</p>	Production System Production Data Dictionary Reference Manuals System Test Document Acceptance Test Document

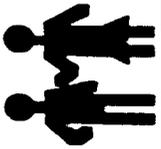


EXHIBIT 7-5: PRODUCTION STAGE ROLES AND RESPONSIBILITIES

ROLES AND RESPONSIBILITIES

<u>ACTIVITIES</u>	<u>OSWER PROGRAM MANAGEMENT</u>	<u>OSWER PROGRAM STAFF</u>	<u>PROJECT MANAGEMENT</u>	<u>PROJECT STAFF</u>	<u>QUALITY ASSURANCE</u>	<u>PROCUREMENT</u>
RESPOND TO DEFERRED CHANGES/ENHANCEMENTS	APPROVE	SUPPORT	LEAD	PERFORM	REVIEW	
RESPOND TO NEWLY PROPOSED CHANGES/ENHANCEMENTS	APPROVE	SUPPORT	LEAD	PERFORM	REVIEW	
CONTINUE CONFIGURATION ACCOUNTING AND CHANGE CONTROL			LEAD	PERFORM	REVIEW	
MONITOR SYSTEM/DATA BASE PERFORMANCE		SUPPORT	LEAD/ PERFORM	SUPPORT		
UPDATE PROJECT MANAGEMENT PLAN		SUPPORT	LEAD/ PERFORM	SUPPORT	REVIEW	
UPDATE DATA MANAGEMENT PLAN		SUPPORT	LEAD/ PERFORM	SUPPORT	REVIEW	
USE SYSTEM/DATA BASE(S) FOR NORMAL PRODUCTION		LEAD/ PERFORM	SUPPORT	SUPPORT		
OPERATE SYSTEM/DATA BASE(S)		PERFORM	LEAD	PERFORM		
PROVIDE USER SUPPORT		SUPPORT	LEAD	PERFORM		

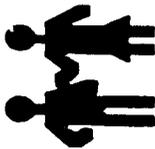


EXHIBIT 7-5: PRODUCTION STAGE ROLES AND RESPONSIBILITIES (Continued)

ROLES AND RESPONSIBILITIES (Continued)

<u>ACTIVITIES</u>	<u>OSWER PROGRAM MANAGEMENT</u>	<u>OSWER PROGRAM STAFF</u>	<u>PROJECT MANAGEMENT</u>	<u>PROJECT STAFF</u>	<u>QUALITY ASSURANCE</u>	<u>PROCUREMENT</u>
MAINTAIN SYSTEM/DATA BASE(S)			LEAD	PERFORM	REVIEW	
DEVELOP AND IMPLEMENT MINOR ENHANCEMENTS AS NEEDED		SUPPORT	LEAD	PERFORM	REVIEW	

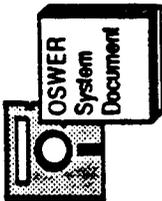


EXHIBIT 7-6: PERFORMANCE REPORT

SUMMARY DESCRIPTION

The Performance Report describes the experience of system and data base use and operation during Production, noting unanticipated events and potential problems. This report serves as a diagnostic tool to aid the project manager, as well as assisting evaluations of the system and data base(s). This report is usually brief, and may include extracts from computer facility reports (e.g., NCC timeshare-related reports) that identify the resources used by the system and data base(s). The Performance Report is prepared periodically in accordance with the schedule noted in the Project Management Plan.

TOPICS

- o Performance period
 - Period covered by report
- o Performance
 - Workload and resources used
 - Response time
- o System/Data base incidents
 - Problems encountered by users and/or operation personnel, including potential software errors, invalid data, and violations of security. Include reports of user hotlines or other user support activities.

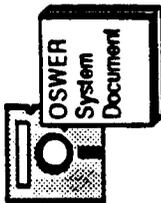


EXHIBIT 7-7 SYSTEM TEST DOCUMENT

SUMMARY DESCRIPTION

The System Test Document is updated during the Production stage to address the testing of maintenance changes and enhancements to the system. The document includes the details of the test plan, as well as the results of testing. Underlined items are added to the System Test Document for the first time during this stage; other material was initially developed during earlier phases and is refined as appropriate during implementation.

TOPICS

- o Introduction
 - Purpose of this document
 - Reference to related documents
- o Testing strategy
- o Test criteria
- o Internal testing
 - Plan
 - Procedures
 - Data description
 - Test results
 - Findings and analysis
 - Recommendations
- o Unit testing
 - Plan
 - Procedures
 - Data description
 - Test results
 - Findings and analysis
 - Recommendations
- o Integration testing
 - Plan
 - Procedures
 - Data description
 - Test results
 - Findings and analysis
 - Recommendations



EXHIBIT 7-7: SYSTEM TEST DOCUMENT (Continued)

- o System testing
 - Plan
 - Procedures
 - Data description
 - Test results
 - Findings and analysis
 - Recommendations

- o Production maintenance and enhancement testing
 - Plan
 - Procedures
 - Data description
 - Test results
 - Findings and analysis
 - Recommendations

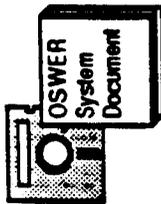


EXHIBIT 7-8: ACCEPTANCE TEST DOCUMENT

SUMMARY DESCRIPTION

The Acceptance Test Document is updated during the Production stage to address the testing of changes and enhancements to the system. The document includes the details of the test plan, as well as the results of testing. Underlined items are added to the Acceptance Test Document for the first time during this stage; other material was initially developed during earlier phases and is refined as appropriate during Production.

TOPICS

- o Introduction
 - Purpose of this document
 - References to related documents
- o Testing strategy
 - Participating organizations
 - Relationship to testing of other systems (if applicable)
 - Approximate schedule
 - Issues to be resolved
- o Test requirements/scenarios
 - Description of representative events or cases to serve as the basis for testing the system against the functional and data requirements, and the expected results for each event or case. This section represents the acceptance criteria for the system.
- o Test plan (for each scenario):
 - Test procedure
 - Test data descriptions and sources
 - Test data (may be included in an appendix if test data is voluminous)
 - Expected test results
- o Test results
 - Summary of test results
 - Identification of tests not completed successfully

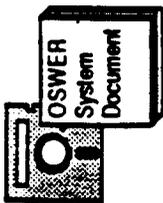


EXHIBIT 7-8: ACCEPTANCE TEST DOCUMENT (Continued)

- o Recommendations
 - Test strategy
 - Test requirements
 - Test scenarios
 - Test plan
 - Test results
 - Recommendations

- o Testing of Enhancements (repeated for each set of enhancements)